

REMARKS

In view of the above amendments and arguments herewith, Applicants believe the pending application is in condition for allowance.

I. Status of the Claims

Claim 31 has been canceled.

Claims 1, 4, 6-14, 17, 20-22, and 27 have been amended.

Claims 32-44 have been added.

Support for these amendments can be found for example at page 8, paragraphs 19 and 22; page 15 paragraph 52, page 16 paragraph 59, pages 16-17 paragraph 60, page 17 paragraph 6, page 18 paragraph 68, and the original claims of the Specification as filed on August 18, 2003.

Claims 1-30 and 32-44 are pending.

No new matter has been added by any amendments to the claims or new claims.

II. Rejections under 35 U.S.C. § 112

Claims 1, 2, 14, 23, 26, and 28-31 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention due to the use of the term “cashew nut shell liquid.” Claim 31 has been canceled, thus the rejection as to claim 31 is moot and Applicants respectfully request withdrawal of this rejection as to claim 31. Claims 32, 38, and 40 have been added and include the use of the term “cashew nut shell liquid.”

Applicants respectfully traverse this rejection. Applicants respectfully submit that cashew nut shell liquid (“CNSL”) is well known to one of ordinary skill in the art. CNSL is extracted from the shell casings of cashews and has a variety of industrial uses which were first developed in the 1930s. *See* Wikipedia, the free encyclopedia definition of Cashew (attached).

CNSL is commercially available for example from Palmer International, Inc. as CAS No. 8007-24-7 (trade name 1500-1 CNSL distillate) and Cardolite Corporation. CNSL has also been cited in numerous technical journals, such as J. Braz. Chem. Soc., Vol. 10, No. 1, 13-20, 1999 Utilisation of Cashew Nut Shell Liquid from *Anacardium occidentale* as a Starting Material for Organic Synthesis: A Novel Route to Lasiodiplodin from Cardols (attached), and various U.S. Patents. See e.g., U.S. Patent Nos. 6,828,383 claims 13 and 33, 6,875,807 claim 21, and 6,797,021 claims 1, 9, and 13. Thus, Applicants respectfully submit that the claims are clear and definite. Accordingly, Applicants respectfully request withdrawal of this rejection.

Claims 6, 21, and 27 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. According to the Examiner, one of ordinary skill in the art would not be able to determine which melamine resin is used to form the product of the claimed formula. For example, if urea-formaldehyde resin or methylated formaldehyde resin is used, then a melamine ring does not exist to form the claimed formula. Claims 6 and 21 have been amended exclude urea formaldehyde resin. Claim 27 have been amended to recite "methylated melamine formaldehyde resin." Accordingly, Applicants respectfully request withdrawal of this rejection.

Claims 2, 18, 23, 28, 29, and 30 have been rejected under 35 U.S.C. § 112, second paragraph. According to the Examiner the use of the trademark/trade name cardanol and cardol makes the scope of the claims uncertain.

Applicants respectfully traverse this rejection. Applicants respectfully submit that cardanol and cardol are not trademarks/trade names and are generic chemical names well known and used in the chemical industry. Cardanol and cardol have also been used in numerous U.S. patents such as U.S. Patent No. 5,348,755 in claims 2 and 15, U.S. Patent No. 6,077,521 in claims 20 and 21, U.S. Patent No. 6,989,411 in claim 4, and U.S. Patent No. 6,887,632 in claims 5 and 6. In addition, attorneys for the Applicants have conducted a basic trademark search on the USPTO website and have not found any trademark names for cardanol or cardol. Accordingly, Applicants respectfully request that this rejection be withdrawn.

III. Rejections under 35 U.S.C. § 103(a)

Claims 1-31 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Chem. Abstract 119: 161751 ("751") or 112: 181468 ("458") or 124: 205109 ("109") or 115: 258415 ("415") or 113: 213128 ("128"). Applicants respectfully traverse this rejection.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based upon one or more of Chem. Abstracts 119: 161751, 112: 181468, 124: 205109, 115: 258415, or 113: 213128.

To establish a *prima facie* case of obviousness, the US Patent Office must satisfy three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *See Karsten Mfg. Corp. v. Cleveland Gulf Co.*, 242 F.3d 1376, 1385 (Fed. Cir. 2001). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. In other words, hindsight analysis is not allowed. *See Amgen Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209 (Fed. Cir. 1991); *In re Erlich*, 3 U.S.P.Q.2d 1011, 1016 (Bd. Pat. App. & Int. 1986). Third, the prior art reference or combination of references must teach or suggest all the limitations of the claims. *See In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A 1970); *see also* M.P.E.P. §§ 2142-43. In addition, "[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness." M.P.E.P. § 2142 (*citations omitted*).

First, the Applicants respectfully submit that none of the cited references provide any motivation to one of ordinary skill in the art to modify the reference to arrive at the presently claimed invention. Nor has the Examiner specifically cited any motivation to modify the references accordingly. As discussed below, the cited references merely disclose various reactants to produce a variety of materials, such as injection molding materials, films, solutions for anticorrosive coatings, topcoat compositions for automobiles, and polymer resins from renewable resources.

Second, Applicants further submit that there is no reasonable expectation of success for any modification of the prior art as none of the cited references provide any motivation to modify the reference. One of ordinary skill in the art cannot simply take various components and combine them without a commonality of purpose or characteristics that gives the artisan some reasonable expectation of success. "Chemical compounds present special issues of obviousness because of the limited number of elements, recurring groups or substitutes in complex molecules, the structural similarities within classes of related compounds, and the ability of chemists to undertake systematic experiments modifying known compounds." *Eli Lilly and Co. v. Zenith Goldline Pharmaceuticals, Inc.* 2001 U.S. Dist. LEXIS 18361 at *14 (S.D. Ind. 2001). "For a chemical compound, a prima facie case of obviousness requires 'structural similarity between claimed and prior art subject matter ... where the prior art gives reason or motivation to make the claimed compositions'." *Yamanouchi Pharmaceutical Co., Ltd v. Danbury Pharmacal, Inc.*, 231 F.3d 1339, 1343 (Fed. Cir. 2000), quoting *In re Dillon*, 919 F.2d 688, 692 (Fed. Cir. 1990) (*en banc*) (emphasis added).

Here, the Examiner contends that

the references do disclose the required reactants under the same or similar conditions to form the claimed products. Therefore, it would have been obvious to one of ordinary skill in the art to select the reactants under conditions from the references within the limitations of the instant claims since they have been shown to be effective in a similar system and thus would have been expected to provide adequate results.

See December 27, 2004 Office Action. Assuming arguendo, that the cited references provide motivation to make the claimed co-polymer, the Examiner has not shown "structural similarity" between the claimed co-polymer and that disclosed in the cited references because there is no disclosure of any structure in any of the cited references, for which the Examiner has already admitted and made of record.

The cited references at best would fall into a category of "obvious to try," without a reasonable expectation of success. However, "obvious to try" without a reasonable expectation of success is not the standard under 35 U.S.C. § 103. The proper test requires determining what

the prior art would have led the skilled person to do. In *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988), the Court of Appeals for the Federal Circuit stated:

In some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. In other words, what was "obvious to try" was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it.

An "obvious to try" situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure itself, but the disclosure does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued.

Here, the cited references, alone or in combination, merely provide various reactants similarly used in the claimed invention with no indication of what reactants or what reaction / process conditions are critical. Thus, a myriad of possibilities exists without any indication of what is likely to be successful to arrive at the present invention.

Moreover, in evaluating obviousness, the courts have made it very clear that one must look to see if "the prior art would have suggested to one of ordinary skill in the art that [the] process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art." *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988). "Both the suggestion and the expectation of success must be found in the prior art, *not in the applicant's disclosure.*" *Id.* (emphasis added).

Thus, as the Examiner contends that "it would have been obvious to one of ordinary skill in the art to select the reactants under conditions from the references within the limitations of the instant claims since they have been shown to be effective in a similar system," Applicants respectfully submit that the Examiner has improperly attempted to establish obviousness by using the Applicants' disclosure as a road map as opposed to the prior art references cited.

Third, Applicants respectfully submit that none of the cited references, alone or in combination, teach or suggest all the limitations of the claimed invention. The Examiner has already admitted that the cited references do not disclose the melamine ring containing copolymer of the claimed formula (I) and none of the cited references disclose or suggest the use of cashew nut shell liquid.

The Examiner further contends that one of the missing elements (*i.e.*, formula (I)) is inherent in the prior art because “all of the references disclose the reactants under process conditions of the original claims, therefore, the claimed product of the formula I must be considered inherent in the prior art.” *See* September 21, 2005 Office Action. Applicants respectfully submit that the Examiner has failed to provide a rationale or evidence tending to show the inherency of formula (I).

“The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic.” M.P.E.P. § 2112 (*citing In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993)). “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill in the art. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999), *see also* M.P.E.P. § 2112.

Even under an anticipation rejection based upon inherency, Applicants respectfully submit that the Examiner has not provided any factual and technical grounds establishing that the inherent feature (*i.e.*, formula (I)) necessarily flows from the teachings of the prior art. *See Ex Parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990).

Independent claims 1, 7, 14, 22, and 43 include the limitation of formula (I). However, claims 1, 14, and 43 further include the limitation of “CNSL” which, as further discussed below, is not disclosed in any of the cited references. Furthermore, claims 7 and 22 does not include any reactant or process limitations as contended by the Examiner as the basis for an inherent

disclosure. The fact that formula (I) may result from the myriad of possibilities of reacting similar reactants under similar conditions is insufficient to establish the inherency of formula (I). The fact that the Examiner has independently cited 5 chem. abstracts alone that result in different materials from allegedly similar reactants and similar process conditions further evidences the fact that it is not clear that formula (I) is inherently disclosed.

Accordingly, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness. As such, Applicants respectfully request that this rejection be withdrawn.

Moreover, with respect to dependent claims 15-17, 24, 35, and 44, these claims are directed to a reaction involving catalysts, a known area of unpredictability. Catalytic activity “can not be forecast by chemical composition, for such action is not understood and is not known except by actual test.” *Corona Cord Tire Co. v. Dovan Chem. Corp.*, 276 U.S. 358, 368-69 (1928); *see also In re Slocombe*, 184 U.S.P.Q. 740, 744 (C.C.P.A. 1975) (“catalytic effects are a particularly unpredictable art in the field of chemistry”).

In *In re Mercier*, 185 U.S.P.Q. 774 (C.C.P.A. 1975), a patent applicant appealed from a decision of the PTO Board of Appeals rejecting claims covering a method of splitting acetals and hemi-acetals. The claims called for the step of passing an acetal or hemi-acetal upwardly through a fluidized catalyst, where the catalyst is a sulfonic ion exchange resin in acid form. The claims had been rejected over a reference teaching the use of an ion exchange resin catalyst for hydrolysis of esters. *See id.* at 777.

On appeal, the Court of Customs and Patent Appeals (the predecessor to the Court of Appeals for the Federal Circuit) reversed the Examiner’s obviousness rejection, concluding that while the cited reference taught the use of acetals, it did not teach the equivalency between acetals and esters for the claimed reaction. The Court stated that the disclosure of a “known relationship” between acetals and esters “does nothing more than teach that it would be *obvious to try*, which is insufficient under section 103.” *Id.* at 779. The Court reasoned that “[m]any compounds have a known relationship but are not equivalents for substitution in different

reactions.” *Id.* The Court also found that the unpredictability in the art of catalytic reactions supported the non-obviousness of the claimed process, and stated:

The conclusion that appellant’s invention would have been nonobvious to one having ordinary skill in the art on the basis of the cited art is further buttressed by the fact that the claimed invention is a catalytic process. The unpredictability of catalytic phenomena has long been recognized by this court. As previously noted, [the prior art] disclosure is relied upon by the board for the proposition that organic oxygen-containing compounds, including acetals, may be hydrolyzed using the catalyst of appellant’s invention. This does not render the process of appellant’s invention any less unpredictable, because a successfully catalyzed process depends not only on the particular catalyst that may be employed but also on the environment within which the catalysis is accomplished.

Id. at 779-80.

Because of the differences between the presently claimed reactants and the reactants disclosed in the prior art, none of the cited references render the claimed invention obvious to one of ordinary skill in the art.

Chem. Abstract 119: 161751

According to the Examiner, 751 discloses melamine resin containing materials comprising melamine resins containing fatty acids, stearic acid melamine resins or behenic acid melamine resins. *See* December 27, 2004 Office Action. As such, it would have been obvious to one of ordinary skill in the art to arrive at the present invention in view of 751.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness as 751 does not disclose all the elements of the invention as presently claimed. 751 merely discloses a melamine resin-containing material for injection molding. In particular, the resin is prepared by mixing melamine, aqueous formaldehyde, pulp, stearic acid, titanium oxide, pigment and other additives, which is then later pulverized, melt kneaded, extruded, pulverized, and used to prepare injection molding materials. As such, 751 fails to disclose or suggest the polymer of formula (I), as presently claimed in independent claims 1, 7,

14, 22, and 43, something which the Examiner has already admitted and is of record. Chem. abstract 751 also fails to disclose the use of CNSL as presently claimed in independent claims 1, 14, 23, 32, and 40. In addition, 751 fails to disclose all of the method steps recited in claims 33 or 43. Thus, 751 does not disclose or suggest all the elements of the present invention. Accordingly, Applicants respectfully submit that 751 does not anticipate or render obvious the present invention.

The Examiner further contends that although 751 does not disclose the melamine ring containing copolymer of the claimed formula or the specific catalysts, it nonetheless would have been obvious to one of ordinary skill in the art to arrive at the claimed invention as the references do disclose the required reactants under the same or similar conditions. Specifically, the Examiner contends that the claimed formula is very broad and no mechanism has been established to show how to arrive at the claimed formula. As such, the products of the claimed formula must be derived from the claimed process (*i.e.*, claim 14). The Examiner further notes that all of the cited references disclose the reactants under process conditions of the original claims, therefore, the claimed product of formula (I) must be considered inherent in the prior art. See June 23, 2005 Office Action.

Applicants respectfully submit that 751 does not disclose or suggest all the reaction conditions or all of the reactants as presently claimed. Claims 33 and 43 each require (a) mixing a melamine base resin and cashew nut shell liquid, (b) heating the mixture from about 140° C to about 170° C, and (c) reacting the mixture for about 4 to about 6 hours. In contrast, 751 discloses mixing melamine and aqueous HCHO and is silent as to any reaction temperatures or reaction times. Thus, as 751 does not disclose the steps (a), (b), or (c) as claimed in claims 33 and 43 or the use of a CNSL reactant as claimed in claims 1, 14, 23, 32, and 40 or the claimed formula as claimed in claims 1, 7, 14, 22, and 43, Applicants respectfully submit that the disclosure of 751 is insufficient to show that the natural result of mixing melamine with aqueous HCHO would result in the present invention for a melamine ring-containing co-polymer or method of manufacturing the same.

Applicants further submit that the present inventive method provides for unexpected results. The present inventive method results in reduced manufacturing and energy costs relative to the production of other melamine ring-containing polymers. As described in Example 1, a melamine ring-containing co-polymer of the present invention was produced in about four hours at a processing temperature of about 160° C, which is less than half the overall process time and at lower processing temperatures of conventional synthetic resins.

Accordingly, for these reasons and the arguments provided above, Applicants respectfully request that the rejection as to claims 1, 7, 14, 22, and 23 be withdrawn. Applicants further submit that claims 2-6, 8-13, 15-21, and 24-30 are patentable over 751 based at least upon their dependency to their respective independent base claims. Furthermore, claims 32-43 contain patentable subject matter over 751.

Chem. Abstract 112: 181468

According to the Examiner, 468 discloses melamine formaldehyde oligomers comprising melamine resin modified with tall oil fatty acids, that is the reaction product of formaldehyde melamine copolymer with tall oil fatty acids or octadecadienoic acid, polymerized with hexakis (methoxymethyl)-1, 3, 5-triazine-2, 4, 6-triamine (melamine). *See* December 27, 2004 Office Action. As such, it would have been obvious to one of ordinary skill in the art to arrive at the present invention in view of 468.

Applicants respectfully traverse this rejection for the reasons given above. Moreover, 468 does not disclose or suggest all the limitations of independent claims 1, 7, 14, 22, 23, 32, 40, 41, 42, or 43. In particular, 468 does not disclose or suggest, the claimed formula (I), the catalysts, cashew nut shell liquid, method steps (a), (b), and (c), or the properties of the claimed co-polymer. In contrast, 468 merely discloses mixing a melamine copolymer with tall oil fatty acids and is silent as to any reaction temperatures, reaction times, or catalysts. Chem. abstract 468 does not disclose reacting CNSL with melamine base resin or the use of a CNSL reactant as presently claimed. Applicants respectfully submit that the disclosure of 468 is insufficient to support the Examiner's contention that the natural result of reacting a melamine copolymer with

tall oil fatty acids would result in the presently claimed compound, co-polymer, or method of preparing a melamine ring-containing co-polymer. Thus, for these reasons and the arguments provide above, Applicants respectfully submit that 468 does not disclose or suggest all the elements or render obvious the present invention.

Chem. Abstract 124: 205109

According to the Examiner, 109 discloses melamine formaldehyde-melamine phthalic anhydride trimethylolpropane copolymer, esterized with soybean oil fatty acids; or formaldehyde polymerized with propanediol, isobenzofurandione and 1, 3, 5-triazine-2, 4, 6-triamine. *See* December 27, 2004 Office Action. As such, it would have been obvious to one of ordinary skill in the art to arrive at the present invention in view of 109.

Applicants respectfully traverse this rejection. In concurrence with the Examiner, 109 merely discloses a melamine formaldehyde-melamine phthalic anhydride trimethylolpropane copolymer that esters with soybean oil. Applicants respectfully submit that 109 fails to teach or suggest all the limitations of the present invention. Thus, for these reasons and the arguments provide above, Applicants respectfully submit that 109 does not disclose or suggest all the elements or render obvious the present invention.

Chem. Abstract 115: 258415

According to the Examiner, 415 discloses benzenedicarboxylic acid, polymerized with 2, 2, dimethyl-1, 3-propanediol, 2-ethyl-2-(hydroxymethyl)-1, 3-propanediol and hexanedioic acid, dodecanoate, polymerized with formaldehyde and 1, 3, 5-triazine-2, 4, 6-triamine. *See* December 27, 2004 Office Action. As such, the Examiner contends that it would have been obvious to one of ordinary skill in the art to arrive at the present invention in view of 415.

Applicants respectfully traverse this rejection. Chem. Abstract 415 merely discloses the modification of oligomeric melamine formaldehyde resins with tall oil compounds. As such, 415 does not teach or suggest all the limitations of the claimed invention. Thus, for the same

reasons discussed above, Applicants respectfully submit that 415 does not render the claimed invention obvious.

Chem. Abstract 113: 213128

According to the Examiner, 128 discloses 1, 3, 5-triazine-2, 4, 6-triamine (melamine), polymerized with cardanol. *See* December 27, 2004 Office Action. As such, the Examiner contends that it would have been obvious to one of ordinary skill in the art to arrive at the present invention in view of 128.

Applicants respectfully traverse this rejection. In concurrence with the Examiner, 128 merely discloses polymerizing melamine with cardanol. In contrast, the present invention requires not only melamine resin and cardanol as reactants, but further requires cardol as a reactant as the claims recite "a melamine base resin and cashew nut shell liquid." CNSL is readily known in the art to include both cardanol and cardol. As such, 128 fails to disclose or suggest a critical reactant and thus does not teach or suggest all the elements of the presently claimed invention. Thus, for these reasons and the arguments provide above, Applicants respectfully submit that 128 does not disclose or suggest all the elements of the present invention.

In sum, none of the cited references, alone or in combination, teaches or suggests all the elements of the Applicants' invention. As such, the Applicants' invention would not be obvious to one of ordinary skill in the art. Accordingly, withdrawal of this rejection is respectfully requested.

In addition, Applicants further request that the Examiner in the next Office Action specifically reference what reactants and under what same or similar conditions are disclosed in any of the cited references to suggest to one of ordinary skill in the art that the resultant composition will necessarily result in the claimed compound.

CONCLUSION

In view of the above amendments and remarks, it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue. If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

No additional fee is required for this amendment. However, should the U.S. Patent and Trademark Office determine that any other fee is due, the Commissioner is here by authorized and requested to charge the required fee(s) to our Deposit Account No. 50-3541.

Respectfully submitted,

GREGORY P. TZAP *et al.*

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(Date)

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